



area is an embossed area as a write-prohibited area.

5. The data storing medium as set forth in claim 1,

5 wherein a write-prohibited area is formed so that the copyright control information is not capable of being error corrected and restored.

6. The data storing medium as set forth in claim 1,

10 wherein data that is different from the copyright control information and that is not detected as an error with error correction code is recorded.

7. The data storing medium as set forth in claim 1,

15 wherein a plurality of write-prohibited areas are formed in a block at intervals of a predetermined distance.

Sub  
A2  
8. The data storing medium as set forth in claim 7,

20 wherein the predetermined distance is equivalent to the length of a plurality of sectors.

9. The data storing medium as set forth in claim 1,

wherein the recorded data has been modulated corresponding to 8-16 modulating method.

Sub  
A3<sup>25</sup>  
10. A data recording apparatus for writing encrypted digital data or non-encrypted digital data to a predetermined data storing medium, comprising:

means for writing the encrypted digital data and copyright control information necessary for decrypting the encrypted digital data to the data storing medium in such a manner that when the encrypted digital data is reproduced the copyright control information is not obtained.

11. The data recording apparatus as set forth in claim 10,

wherein in the process, as data that is written to an area for the copyright control information, data that is different from the copyright control information is encoded with error correction code and the resultant data is formed in the area.

12. The data recording apparatus as set forth in claim 10,

wherein in the process, data written to the area for the copyright control information is converted in such a manner that the data is not corrected by an error correcting process performed when the encrypted digital data is reproduced.

13. The data recording apparatus as set forth in claim 12,

wherein the error correcting process is an error detecting and correcting process.

14. The data recording apparatus as set forth in claim 12,

wherein the error correcting process is an error

erasing and correcting process.

15. The data recording apparatus as set forth in claim 12,

5 wherein the data converting process is a process for exclusively ORing the copyright control information and different data, encoding the resultant data with error detection and/or correction code, and removing the different data.

10 16. The data recording apparatus as set forth in claim 12,

15 wherein the data converting process is a process that satisfies the relation of  $2a + b \geq d$  where "a" is the number of lines that are not erased as an error of the copyright control information, "b" is the number of lines that are erased thereof, and "d" is the minimum distance of the error correction code.

17. The data recording apparatus as set forth in claim 10,

20 wherein the recorded data has been modulated corresponding to 8-16 modulating method.

25 18. A data recording method for writing encrypted digital data or non-encrypted digital data to a predetermined data storing medium, comprising the step of:

writing the encrypted digital data and copyright control information necessary for decrypting the encrypted digital data to the data storing medium

09633164-031400

Sub  
a4



data from a data storing medium on which an error correction block containing copyright control information necessary for decrypting encrypted digital data has been written,

5                wherein even if the entire error correction block is not error-corrected, data of the error correction block that does not contain the copyright control information and that does not have an error is reproduced.

10            23.            A data storing medium, comprising:

                 a first area in which digital data is written; and

                 a second area in which control data necessary for reproducing the data from said first area is written, said second area having at least a write-prohibited portion.

15            24.            The data storing medium as set forth in claim 23,

                 wherein in said second area, a portion in which copyright control information about the digital data for said first area is written is the write-prohibited portion.

20            25.            The data storing medium as set forth in claim 23,

25                wherein said second area is composed of a plurality of sectors, and

                 wherein at least a sector for the copyright

control information of said second area is the write-prohibited portion.

26. The data storing medium as set forth in claim 23,

5 wherein a plurality of write-prohibited portions are formed at predetermined intervals in said second area.

27. The data storing medium as set forth in claim 23,

10 wherein a plurality of write-prohibited portions are formed at predetermined intervals in said second area so that reproduced data is synchronized.

28. The data storing medium as set forth in claim 23,

15 wherein the data storing medium is a recordable optical storing medium, and

wherein the write-prohibited portion is pre-formed in said second area.

29. The data storing medium as set forth in claim 28,

20 wherein the write-prohibited portion is formed as an embossed area on the recordable optical storing medium.

30. The data storing medium as set forth in claim 23,

25 wherein said second area is formed on the medium so that said second area is read earlier than

said first area.

31. The data storing medium as set forth in claim 23,

wherein digital data that is written in said first area has been encrypted.

5  
Sub  
A6 → 32. A data reproducing method for a data storing medium having a first area in which digital data is written and a second area in which control data necessary for reproducing the data from the first area is written, the second area having at least a write-prohibited portion, the data reproducing method comprising the steps of:

10 reading the control data from the second area; and

15 reproducing the digital data from the storing medium corresponding to the control data that has been correctly read.

33. The data reproducing method as set forth in claim 32, further comprising the steps of:

20 detecting an error from the control data that has been read; and

reproducing the digital data using control data of which an error flag corresponding to the error detected result has not be set.

25 34. A data writing method for a data storing medium having a first area in which digital data is written and a second area in which control data



necessary for reproducing the data from the first area is written, the data writing method comprising the step of:

5 writing the control data to the second area in such a manner that part of the control data is not reproduced.

35. The data writing method as set forth in claim 34,

10 wherein the control data written in the second area contains copyright control data about the digital data written in the first area, the copyright control data being written in the second area in such a manner that the copyright control data is reproduction-prohibited.

15 36. The data writing method as set forth in claim 35,

20 wherein the copyright control data is converted in such a manner that the relation of  $2a + b \geq d$  is satisfied where "a" is the number of lines that are not erased as an error of the copyright control information, "b" is the number of lines that are erased thereof, and "d" is the minimum distance of the error correction code.

25 37. The data writing method as set forth in claim 35,

wherein the copyright control information is reproduction-prohibited by exclusively ORing the

copyright control information and different data,  
encoding the resultant data with error detection and/or  
correction code, and removing the different data.

38. A data writing method for a data storing  
medium having a first area in which digital data is  
written and a second area in which different data that  
is read before the digital data is read when the  
digital data is reproduced, the data writing method  
comprising the step of:

writing the different data to the second area  
in such a manner that part of the different data is not  
reproduced.

39. The data writing method as set forth in claim  
38,

wherein the different data is written to the  
second area in such a manner that the different data is  
reproduction-prohibited.

40. The data writing method as set forth in claim  
39,

wherein the different data is converted and  
written to the second area in such a manner that the  
different data is not corrected by an error correcting  
process.

41. The data writing method as set forth in claim  
40,

wherein the different data is converted in  
such a manner that the relation of  $2a + b \geq d$  is

satisfied where "a" is the number of lines that are not  
erased as an error of the copyright control  
information, "b" is the number of lines that are erased  
thereof, and "d" is the minimum distance of the error  
correction code.

42. The data writing method as set forth in claim  
40,

wherein the different data is converted by  
exclusively ORing the copyright control information and  
different data, encoding the resultant data with error  
detection and/or correction code, and removing the  
different data.

43. The data writing method as set forth in claim  
38,

wherein the digital data written to the first  
area is encrypted data.

44. The data writing method as set forth in claim  
38,

wherein the different data that is written to  
the second area is data containing copyright control  
data about the digital data that is written to the  
first area.

45. A data writing apparatus having a data  
storing medium having a first area in which digital  
data is written and a second area in which control data  
necessary for reproducing the data from the first area  
is written, the data writing apparatus comprising:

a writing portion for writing data to the data storing medium; and

a data processing portion for supplying data to said writing portion in such a manner that at least part of the control data is reproduction-prohibited.

46. The data writing apparatus as set forth in claim 45,

wherein said data processing portion converts the copyright control data of the control data in such a manner that the copyright control data is not corrected by an error correcting process.

47. The data writing apparatus as set forth in claim 45,

wherein said data processing portion converts the copyright control data in such a manner that the relation of  $2a + b \geq d$  is satisfied where "a" is the number of lines that are not erased as an error of the copyright control information, "b" is the number of lines that are erased thereof, and "d" is the minimum distance of the error correction code.

48.        The data writing apparatus as set forth in  
claim 46,

wherein said data processing portion exclusively ORes the copyright control information and different data, encodes the resultant data with error detection and/or correction code, and removes the different data.

49. A data writing apparatus for a data storing medium having a first area in which digital data is written and a second area in which different data that is read before the digital data is read from the first area when the digital data is reproduced from the first area, the data writing apparatus comprising:

a writing portion for writing data to the data storing medium; and

a data processing portion for supplying data to said writing portion in such a manner that at least part of the different data is reproduction-prohibited.

50. The writing apparatus as set forth in claim 49,

wherein said data processing portion converts the different data in such a manner that the different data is not corrected by an error correcting process.

51. The writing apparatus as set forth in claim 50

wherein said data processing portion converts the different data in such a manner that the relation of  $2a + b \geq d$  is satisfied where "a" is the number of lines that are not erased as an error of the copyright control information, "b" is the number of lines that are erased thereof, and "d" is the minimum distance of the error correction code.

52. The data writing apparatus as set forth in claim 50,

wherein said data processing portion  
exclusively ORes the different data and other data,  
encodes the calculated result with error detection  
and/or correction code, and performs a process for  
5 removing the other data from the encoded data.

53. A data storing medium, comprising:

a first area in which digital data is  
written; and

10 a second area in which control data necessary  
for reproducing the data from said first area is  
written, said second area having at least a write-  
prohibited portion.

54. The data storing medium as set forth in claim  
53,

15 wherein in said second area, at least a  
portion to which data that is read before the digital  
data written in said first area is reproduced is the  
write-prohibited portion.

55. The data storing medium as set forth in claim  
20 53,

wherein said second area is composed of a  
plurality of sectors, and

25 wherein in said second area, at least a  
sector to which the data that is read before the  
digital data written in said first area is reproduced  
is written is the write-prohibited portion.

56. The data storing medium as set forth in claim

53,

wherein said second area has a plurality of write-prohibited portions formed at predetermined intervals.

5 57. The data storing medium as set forth in claim 53,

wherein said second area has a plurality of write-prohibited portions formed at predetermined intervals in such a manner that the digital data that is read from said first area is synchronized.

10 58. The data storing medium as set forth in claim 53,

wherein the data storing medium is a recordable optical storing medium, and

15 wherein the write-prohibited portion is pre-formed in said second area.

59. The data storing medium as set forth in claim 58,

20 wherein the write-prohibited portion is formed as an embossed area on the recordable optical storing medium.

60. The data storing medium as set forth in claim 53,

25 wherein said second area is formed on the medium in such a manner that said second area is read earlier than said first area.

61. The data storing medium as set forth in claim

**THE UNIVERSITY OF CHICAGO**

45